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SPOT SEEDING ON A BROADCAST BURNED LODGEPOLE PINE CLEAR CUTTING

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A practical test[1/] of spot seeding lodgepole pine was installed in a broadcast burned clear cutting in the Little Belt Mountains of central Montana in June 1950. The seeding site lay on a gentle south slope at an elevation of about 6,400 feet. Broadcast slash burning in September 1949 destroyed the lodgepole pine seed contained in cones on the ground and in the slash. Thus, the area was deprived of seed and artificial regeneration became necessary in order to restock it promptly with tree growth.

The operation required 1½ pounds of seed and 128 man-hours of labor to scalp the spots and plant the seeds on 11 acres. Although the area appeared to be cleanly burned, scalping was difficult and time consuming because a tough mat of bearberry stems and huckleberry roots had to be penetrated underneath the burned surface to reach mineral soil. The spots were prepared on a 6- by 8-foot spacing (908 spots per acre) by scalping a 6- to 12-inch square at each location. Seeds were scattered on mineral soil over a 4- to 6-inch circle within each spot, and covered with a thin layer of soil which was gently firmed by hand or foot. Because the seeds had been found to be 30 percent viable, about 10 were placed in each spot in order to provide approximately 3 viable seed per spot.

Even though a rodent census in advance of seeding disclosed a light population, rodent control measures were conducted in order to insure that seed destruction would be minimized. One hundred seventy-five pounds of thallium-coated sunflower seeds were distributed at bait stations throughout the planting site and a one-quarter mile buffer zone. Bait stations were spaced 25 feet apart, and one tablespoon of bait was placed at each. The wide buffer zone was included to prevent re-invasion by rodents during the seeding. In order to measure seed destruction, 100 seed spots were protected with conical wire screens on a line diagonally across the plantation for comparison with 100 unscreened seed spots along a parallel line.

One hundred 1-1 lodgepole pine nursery transplants were planted to provide a comparison of survival and growth between seed planting and tree planting.

1/ Several cooperators assisted in the test. From the U. S. Fish and Wildlife Service, Lowell Adams, Biologist, conducted the rodent sampling; Warren D. Bloys and Edwin Bodell, Predator and Rodent Control, working under the direction of E. F. Grand, assisted in rodent control. Four men from the White Sulphur Springs District, Lewis and Clark National Forest, helped prepare spots and plant seeds.

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RESULTS

Seed began to germinate within one month of planting time and continued through August of the first season, and to a smaller extent in the second growing season. By the end of the second season 32 percent of the total number of seedlings had died but 67 percent of the spots were stocked with one or more seedlings, as is shown in the following table.

Date of examination	Stocked spots[1] per acre	Seedlings per stocked spot[1]	Stocked[1] spots
	Number	Number	Percent
7-23-1950	654	2.9	72
9-14-1950	672	3.0	74
6-13-1951	617	2.6	68
8-13-1951	608	2.5	67

1/ One or more live seedlings per spot.

Ninety-eight percent of the planted nursery trees survived.

The causes of seedling mortality in the seed spots were not studied specifically, but observations indicated that smothering and drought were rather significant factors. Smothering caused 19 percent of the deaths and drought 10 percent. Erosion, frost heaving, and insects probably caused about 8 percent of the losses. However, we were unable to determine the cause of death of the remaining 63 percent of the dead trees because they were missing at time of re-examination.

Evidence obtained by rodent census (trapping) during and after seeding indicated successful control of rodents. Although the screened spots had 10 percent higher stocking than the paired unscreened spots, the difference probably is not indicative that substantial rodent damage occurred. We believe that the protection afforded by the screens against smothering and surface drying caused most of the difference.

DISCUSSION

The test demonstrates that lodgepole pine can be spot seeded successfully on freshly clear cut and burned land when rodents are absent and weather conditions during early growing seasons are favorable. The soil was wet during seeding. Late afternoon rains of one- to two-hour duration, preceded by bright warm days, fell on five successive days following seeding. Soil moisture was generally plentiful and rainfall was well distributed during the rest of the first growing season.

The cost of lodgepole pine seed, $2.16 per acre, was substantially less than for an equivalent amount of nursery propagated planting stock. The time required for planting trees probably would have been about the same as for direct seeding by the method employed[2]. Rodent poisoning (68 cents per acre for the actual acreage poisoned) is an extra cost of direct seeding which is not required by tree planting.

2/ Schopmeyer, C. S., and Helmers, A. E. Seeding as a means of reforestation in the Northern Rocky Mountain region. U. S. Dept. Agr. Cir. 772, illus., 30 pp. 1947.